ISSN: 0975-3583, 0976-2833 VOL14, ISSUE3, 2023

Original Research Article

FUNCTIONAL AND RADIOLOGICAL OUTCOME OF SHAFT HUMERUS FRACTURE TREATED WITH HUMERUS INTERLOCKING NAIL IN ADULT POPULATION.

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Abstract

Background & Methods: The aim of the study is to study functional and radiological outcome of shaft humerus fracture treated with humerus interlocking nail in adult population. In all patients fracture was temporarily stabilized with Plaster of Paris U-Slab and arm pouch sling. It was made sure to stabilize the patient optimally and adequate pain management was undertaken. Medications for their existing comorbidities were continued.

Results: The functional Range of Movements in shoulder joint after Nailing is excellent and good in 90% of patients and fair in (10% patient). The decrease in movement in 1 patient is due to the impingement of nail. The elbow function recovered in almost all patients with 89% excellent result and 11 % has good recovery.

Conclusion: The chance of infection is more in the Plating group than in patients treated with Closed reduction and Interlocking Nailing patients. The Restriction of shoulder movements are seen in patients in the Nailing group possible due to Prominent nail tip at the entry site and also due to violation of the Rotator Cuff. Non-union can occur due to distraction of the fracture site while Nailing. The better designed interlocking nails with improved surgical techniques have promising results with several advantages. Interlocking nailing is a relatively quick, minimally invasive, biomechanically sound, cosmetically better method of internal stabilization of shaft humerus fractures with less union time, less infection and lesser threat to radial nerve and other complications.

Keywords: radiological, shaft, humerus, fracture & nail.

Study Design: Observational Study.

1. Introduction

Fractures of the shaft of humerus account for approximately 3-5% of all fractures treated. Historically humeral shaft fractures have been classified by fracture location, fracture pattern, associated soft tissue injuries and quality of bone[1]. This fracture has been treated by closed reduction & cast application with/without cast bracing and open reduction & internal fixation using dynamic compression plate. Many authors have documented the general good outcome that occurs after compression plate fixation, which is still considered the gold standard for operative treatment of acute humeral shaft fractures[2].

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The humerus is a long bone which has a cylindrical central part called the shaft and enlarged upper and lower ends. The anterior aspect of the upper end shows a prominent vertical groove called the intertubercular sulcus[3].
The head is rounded and has a smooth articular surface. It is directed medially and also backwards and upwards. The upper end also shows two prominences called the greater and lesser tubercles[4]. These two tubercles are separated by intertubercular sulcus[5].
There are two distinct regions of the upper end of the humerus that are referred to as the neck[6]. The junction of the head with the rest of the upper end is called the anatomical neck, while the junction of the upper end with the shaft is called the surgical neck.
Humeral shaft is one in which main fragment is distal to the surgical neck of the proximal humerus and proximal to the supracondylar ridge distally. Proximally the humerus is roughly cylindrical in cross section tapering to triangular shape distally.

2. Material and Methods

Present study was conducted at AIMS, Dewas, M.P. for 01 Year. In all patients fracture was temporarily stabilized with Plaster of Paris U-Slab and arm pouch sling. It was made sure to stabilize the patient optimally and adequate pain management was undertaken. Medications for their existing comorbidities were continued. About 3 cm incision were made at the anterolateral margin of acromion. Subcutaneous tissue incised to expose deltoid fibres which was split to expose supraspinatus. Supraspinatus was sharply incised along the line of fibres and retracted gently to expose head of humerus.

Inclusion criteria

1. Adult patients equal or more than 18 years of age with primary fracture shaft of humerus and history of trauma.
2. Noncompliant patient for conservative treatment.
3. Segmental fracture.
4. Failed or unacceptable reduction for conservative treatment.
5. Obesity / Pendular breast.

Exclusion criteria:

1. Age below 18 years of age.
2. Patients who are medically unfit.
3. Patients with local tissue condition making the surgery inadvisable.
4. Associated previous surgery of humerus.
5. Pathological fractures.

3. Result

Table No. 1: AGE DISTRIBUTION

S. No.	INTERLOCKING NAILING	No.	Percentage
1	21-40 Years	27	54
2	41-60 Years	16	32
3	61-80 Years	07	14

Majority of the patients for the study in the Interlocking nailing is 21 to 40 years (54%)

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE3, 2023

Table No. 2: MODE OF INJURY

S. No.	INTERLOCKING NAILING	No.	Percentage
1	RTA	28	56
2	Fall	15	30
3	Assault	07	14

The mode of injury in most of the cases in both the groups are due to Road Traffic Accidents (56% in IL nailing).The remaining are due to fall 30 % and due to assault 14%.

Table No. 3: SIDE OF INJURY

S. No.	INTERLOCKING NAILING	No.	Percentage
1	RIGHT	29	58
2	LEFT	21	42

58% of the patients in the study have involvement of the dominant side (Right).

Table No. 4: TIME TAKEN FOR UNION

SURGICAL PROCEDURE	TIME TAKEN FOR UNION		AVERAGE
	MINIMUM	MAXIMUM	
INTERLOCKING NAILING	15 WEEKS	28 WEEKS	23 WEEKS

The minimum time taken for union in the group treated with Interlocking nailing is 15 weeks and the maximum time is 28 weeks with an average of 23 weeks.one case went in for non – union.

Table No. 5: FUNCTIONAL OUTCOME

RATING	Shoulder Rom	Elbow Rom	Pain	Disability
Excellent	67%	89%	None	None
Good	23%	11%	Occasional	Minimum
Fair	10%	-	With activity	Moderate
Poor	-	-	Variable	Severe

The functional Range of Movements in shoulder joint after Nailing is excellent and good in 90% of patients and fair in (10% patient). The decrease in movement in 1 patient is due to the impingement of nail. The elbow function recovered in almost all patients with 89% excellent result and 11 % has good recovery.

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4. Discussion

Treatment of humeral shaft fractures in adults remains a challenging issue. Non-operative treatments are still considered an option. Union rates of more than 90% are often reported. Acceptable alignment of humeral shaft fractures is considered to be 3 cm of shortening, 30° of varus/valgus angulation, and 20° of anterior/posterior angulations[7]. Varus/valgus angulation is tolerated better proximally, and more angulations may be tolerated better in patients with obesity. There is no universal agreement on optimal modality of fixation when surgical intervention is chosen. Plating carries the risk of infection, neurological insults and non-union[8].

In this study one patient in the Interlocking Nailing group went in for non-union (10%) which required secondary procedure. In a study by Mohit et al, showed a non-union rate of 8 % in patients treated with Interlocking Nailing[9].

Stern et al reported 70 humeral shaft fractures stabilized with several types of non-locked intramedullary devices. They reported complications in 67% of fractures with 15% of fracture going for delayed union and 8.3% for non-union. Adhesive capsulitis of shoulder developed in 56% of patients[10].

A prospective series of 89 humeral shaft fractures stabilized with Ender nails. Middle and proximal third fractures were fixed by retrograde nailing and distal third fractures by antegrade nailing. 99% of fractures united at an average of 7.2 weeks. There were no infections or malunions. Two patients had post-operative radial nerve palsy which recovered completely. Nail back out was reported in 8 patients[11]. The authors concluded that closed intramedullary Ender nailing could be performed safely and effectively in selected humeral shaft fractures.

5. Conclusion

The chance of infection is more in the Plating group than in patients treated with Closed reduction and Interlocking Nailing patients. The Restriction of shoulder movements are seen in patients in the Nailing group possible due to Prominent nail tip at the entry site and also due to violation of the Rotator Cuff. Non-union can occur due to distraction of the fracture site while Nailing.

The better designed interlocking nails with improved surgical techniques have promising results with several advantages. Interlocking nailing is a relatively quick, minimally invasive, biomechanically sound, cosmetically better method of internal stabilization of shaft humerus fractures with less union time, less infection and lesser threat to radial nerve and other complications.

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